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Meetings

Earth Tides Symposium

The Ninth International Symposium on Earth Tides will be held in New York City on August 17–22. Sponsored by IAG, IUGG, and Columbia University, the symposium will include technical sessions on tidal analyses; ocean tides and tidal modeling; interaction of earth and ocean tides; absolute relative gravity; rotation of the earth and polar motion; crustal deformation; plate tectonics and earthquake-triggering mechanisms; and observations of tilt and gravity. A tour of the Lamont-Doherty Geological Observatory will be included in the week-long meeting.

For additional information and for registration materials, contact John T. Kuo, 828 S.W. Mudd, Columbia University, New York, NY 10027.

Coastal Society Conference

A call for papers has been issued for the Coastal Society's 7th Annual Conference, entitled 'Achievements of the 70's, Prospects for the 80's.' The conference will be held in Galveston, Texas, October 11–14.

Topics included on the conference tentative agenda are future directions of coastal management; the potential effects of future technology and changes in public preferences; program implementation and evaluation; coastal management as an academic program; the push to streamline and reduce government regulation; energy facility siting and related impacts; coastal hazards; wetlands and estuary management; coastal access and recreation; ports and harbor development; and urban waterfronts. A poster session has also been scheduled.

The deadline for 250-word abstracts of prospective conference papers is June 1. Send the abstracts and requests for additional information to Niels West, Coastal Society Conference, Department of Geography and Marine Affairs, University of Rhode Island, Kingston, RI 02881.

Terrestrial Impacts and Evolution

The Lunar and Planetary Institute and the National Academy of Sciences will cosponsor a conference entitled 'Large Body Impacts and Terrestrial Evolution: Geological, Climatological, and Biological Implications.' The meeting is scheduled for October 19–22 in Snowbird, Utah. Leon T. Silver is the convenor.

On the agenda are sessions on the nature and flux of near-Earth objects; physics of high-energy impacts; the biological record and evidence for catastrophic extinction; the search of the geological record for physical evidence of major impacts; and meteorological and climatological consequences of large-scale impacts.

Interested potential participants should send a brief description of their proposed contribution to Earth Impact Conference, Lunar and Planetary Institute, 3303 NASA Road 1, Houston, TX 77058; deadline is June 15. Indicate whether you wish to speak (5 min or 25 min) and/or intend to submit an abstract, and indicate your general area of scientific interest.

News

Drought Conditions Continue

Drought conditions continue in many areas of the United States, with well-below-normal streamflows reported during April in parts of 42 states, according to the U.S. Geological Survey.

USGS hydrologists said that half of the 166 key index stations reporting in April showed streamflow within the lowest 25% of record. New record low levels for the month were set in parts of Maine, New York, Virginia, North Carolina, Wyoming, and New Mexico. Deficient flows have been reported throughout portions of the Midwest and East since early last summer.

Also symptomatic of this national dry trend, combined flow of the nation's 'Big Five' rivers—Mississippi, St. Lawrence, Columbia, Ohio, and Missouri—averaged 716 billion gallons a day (bgd) during April, 37% below normal. Average flow of the Big Five has now been below normal for 5 of the last 6 months.

The Big Five, which represent stream runoff for more than half of the conterminous United States, provide a quick, useful check on the status of the nation's water resources. Highlights of the Big Five for April:

- Despite a 5% seasonal increase, combined runoff remains below normal. For example, despite an 81% increase in flow since March, flow of the Missouri River at Hermann, Mo., averaged 45% below normal for April.
- Individual flows for the Big Five for April: Mississippi River near Vicksburg, Miss., 282 bgd, 56% below normal and 14% below that of last month; St. Lawrence River near Massena, N.Y., 168 bgd, 4% above normal but 2% below the previous month; Ohio River at Louisville, Ky., 125 bgd, normal for this time of year and a 36% increase over the March runoff; Columbia River at The Dalles, Ore., 108 bgd, 26% below normal but 49% above March; and the Missouri River at Hermann, Mo., 34 bgd, 45% below normal but 81% above that of March.

STREAMFLOW DURING APRIL

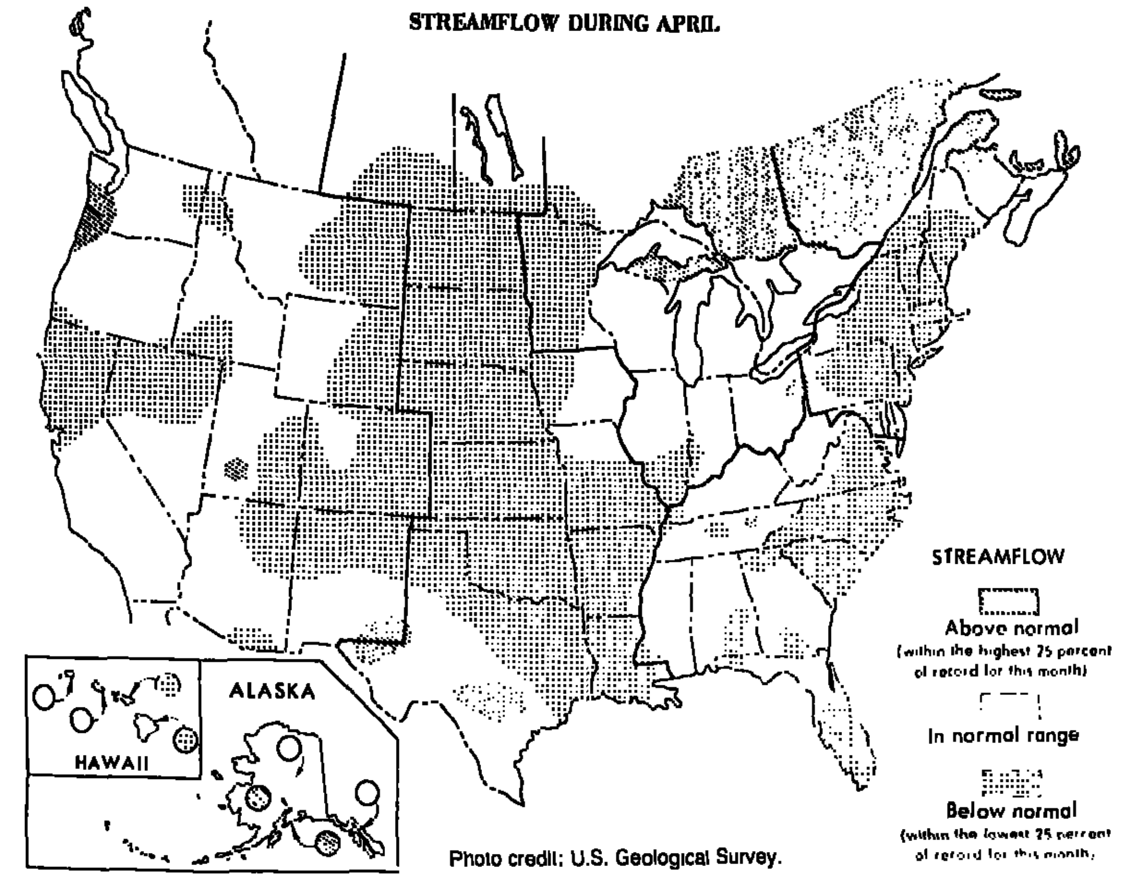

Photo credit: U.S. Geological Survey.

EOS
TRANSACTIONS, AMERICAN GEOPHYSICAL UNION
The Weekly Newspaper of Geophysics

Send double-spaced manuscripts (four copies) to *Eos*, AGU, 2000 Florida Avenue, N.W., Washington, D.C. 20009, or send them directly to one of the associate editors with a copy to the above address.

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Cover. The Cooperative Convective Precipitation Experiment (CCOPE), managed jointly by the National Center for Atmospheric Research and the Department of Interior's Water and Power Resources Service, will employ 14 aircraft, 8 large weather radars, 5 rawinsondes to probe the upper atmosphere, and a satellite-linked network of 100 automated ground stations to monitor the development of storms and thundershowers and to measure mature storm clouds like this cumulonimbus. See news item on p. 498. (Photo courtesy of NCAR.)

Minerals Bill Introduced in House

A bill that aims to strengthen a national minerals policy and to establish a three-member White-House-level council to coordinate the development of this policy was introduced in the House of Representatives on April 30 by James D. Santini (D-Nev.). Entitled the National Minerals Security Act (NMSA), the legislation, if passed, also would amend tax laws to assist the mining industry to make capital investments to locate and produce strategic minerals; it would provide the means for the Secretary of the Interior to make withdrawn public lands available for mineral development; and it would create a revolving fund for the sale and purchase of strategic minerals.

Santini estimates that 4 billion tons of minerals are needed annually to sustain the nation's economy. Much of the minerals are supplied by other nations, however; Santini wants to see an end to the United States' dependence on foreign countries, especially those that seem relatively unstable politically. 'The U.S. has placed its national security in the hands of a few foreign nations,' Santini said in a recent press conference. 'We are heavily dependent on the region of southern Africa for 76% of our cobalt, 93% of our platinum, 48% of our chromium, and a host of other strategic and critical minerals. Without these minerals, we cannot build jet aircraft, weapons, or other military hardware vitally important to our national security.'

NMSA was designed to assure national minerals security and economic stability, according to Santini.

Santini says the bill is backed by nearly four dozen congressmen. He is therefore optimistic about passage of the bill, despite the many jurisdictional and committee boundaries it crosses. Santini said the Reagan administration seems to favor a strong independent minerals policy.

Accessibility to public lands for mineral exploration would be increased with the bill's enactment. Although it will not overturn previous legislation, it does set out a procedure for the review of potentially mineral-rich areas for possible exploration. The stockpiling act would be amended, however, as would tax laws. Amendments to the stockpiling act would allow for the immediate expenditure of funds generated by the sale of stockpiled materials, Santini explained. These funds would be used for the acquisition of other strategic and critical materials, he added. The tax law amendments would provide for tax-exempt financing for the mining industry for pollution control and government-mandated expenditures.

The Council on Minerals and Materials that would be set up by Santini's bill would be an addition to the Office of the President. The council would coordinate and review all government activities that affect minerals and would submit recommendations to the President aimed at maintaining a consistent minerals policy, Santini said.—*BTR*

Diamonds Found in Antarctic Meteorite

Tiny crystals of diamond have recently been found in a 10.4-kg iron meteorite collected from the Allan Hills region of the Antarctic ice cap in 1977. The discovery was reported in *Nature* by Roy S. Clarke, Jr., Daniel E. Appleman, and Daphne E. Ross, all of the Smithsonian Institution's National Museum of Natural History. (The Antarctic Meteorite Program is a joint activity of the National Science Foundation, the Smithsonian Institution, and NASA. The specimens are preserved, described and distributed by NASA's Planetary Materials Laboratory at Johnson Space Center, Houston.)

This is only the second iron-type meteorite discovered to have diamonds within it. The other meteorite, the Canyon Diablo, which formed the mile-wide Meteor Crater in Arizona about 50,000 years ago, was much larger on impact. The diamonds within it are believed to have been produced as a result of the shock pressure of impact when it hit the earth. The Antarctic meteorite is much smaller and could not have produced a sufficient shock when it hit the earth—therefore, the diamonds must have been produced as a result of a collision in space.

The diamonds were found as invisible crystals in small carbon-rich fragments found inside the nickel-iron metal that makes up the meteorite. They were discovered when a saw, used to slice the meteorite, came up against one of the diamond-bearing inclusions and could not cut further. X ray studies then established the presence of diamond together with two other forms of carbon: a rare mineral called lonsdaleite, chemically identical but a different crystal struc-

(News cont. on page 498)

Special Announcement

The Oceanography Report

The Oceanography Report will be a monthly section in *Eos*, beginning in August 1981. I will, as an *Eos* associate editor, oversee the report. The purpose of the Oceanography Report is to provide an information source and focal point for the very diverse oceanography community, both within and outside the AGU membership. Physical, chemical, geological, and biological oceanography are included within the report. While the Oceanography Report will be part of *Eos*, it is anticipated that by mid-1982 all oceanographic information within the pages of *Eos* will also be reformatted into a separate publication for distribution beyond AGU membership. This is particularly important in reaching the marine biologists, who ordinarily are not members of AGU. The Oceanography Report will attempt to meet the needs of oceanographers, who presently are not fully represented by any national professional society.

The following material will be included in the Oceanography Report:

- *Articles*—The authored articles present the research background and objectives of specific research projects or scientific aspects of oceanography. These articles should help bridge the gap between the various oceanographic research areas and should encourage interdisciplinary exchange by informing oceanographers as to what is happening in both their own and other branches of oceanography.
- *Announcements and News Items*—In this section, government agencies, science programs, and industry can present brief items of interest for a wide audience of oceanographers.
- *Special Information Articles*—This section allows an AGU reporter to present a discussion of a broad range of items of concern in oceanography: problems of decreased graduate student enrollment; a review of all available newsletters, highlighting various agency or science program developments; or trends in funding for particular research.
- *Letters of Opinion*—Signed letters of opinion can be sent to the associate editor of the Oceanography Report for publication. The subject of these letters can range widely, from philosophical presentation of perceived research and educational or funding problems in oceanography to specific items of concern and/or personal reflections of the current status of the field. Humorous satirical commentary will also be considered.

Oceanography-related information in existing sections of *Eos*, such as Book Reviews, New Publications, GAP, can be held until the Oceanography Report issue appears. Advertising space can be reserved for issues carrying the report. An oceanographic subset of Geophysical Year will also appear with the report.

The success of the Oceanography Report depends entirely on active participation of the oceanography community. [illegible]

[illegible]

(News cont. from page 497)

ture than diamond, and graphite, the familiar form of carbon used in lead pencils.

The tiny amounts of diamond found by Clarke and his colleagues have no commercial value. The meteorite is probably a fragment of an asteroid, and since diamonds only form at high pressures, such as those existing deep within the earth, their presence suggests a great collision that probably took place in the asteroid belt many millions of years ago.

This news item was contributed by Bevan French, NASA Planetary Materials Scientist. ⊠

Scientists CCOPE With Storms

The sun gently noses its way above the horizon in southeastern Montana with the seeming promise of a carefree, sunny day. But that promise won't hold true for 200 scientists readying themselves for another frenetic day in the largest field research experiment on storms and thundershowers.

Fieldwork for the 4-month project dubbed CCOPE (Cooperative Convective Precipitation Experiment) began this week near Miles City, Mont. CCOPE's principal objective is to measure storm development in detail to learn precisely how rain and hail are produced, with the eventual harvest being timely warnings for severe storms and accurate precipitation predictions. This knowledge will aid in the planning of water supply strategies.

'Over the past three decades we have learned much about the physical processes that lead to rainfall, as well as hail and tornadoes,' said Wilmot N. Hess, director of the National Center for Atmospheric Research (NCAR). 'But we have yet to put the pieces together convincingly. As a result, we don't yet sufficiently understand why some storms produce only scattered or gentle rain and some cloudbursts, hail and high winds.'

Putting the pieces together is, at best, a complex jigsaw puzzle, requiring for its solution $8 million, a total of 6 years for planning and data analysis, and the help of 29 institutions, including several in Canada, Italy, and England.

Even serene, cloudless days can give birth to storms, so observations to determine what influences the growth and severity of storms begin early in the day, according to NCAR. During this period, when solar heating of the air near the ground begins and the sky is cloudless, or nearly so, several pairs of Doppler radars with their dish-shaped antennae simultaneously map air motions in the clear air. During a thunderstorm, which can be more than 10 miles in height, breadth, and width, as many as 10 of CCOPE's fleet of 14 airplanes fly simultaneously in and around the storm. Eight radars measure water concentrations and motions within the storm, while weather balloons, launched from five sites, take atmospheric measurements. Aircraft and radars are directed by project managers in the central control room that monitors incoming data.

The data gathered will be used to research

- how ice crystals and hailstones form;
- the effects of air outside a cloud mixing with air inside a cloud;
- composition changes of ice and water particles in clouds;
- atmospheric chemistry;
- storm airflow, including updrafts, downdrafts, wind speed, and direction;

Thunderstorms and rainshowers are crucial to summer water supplies in most of the United States. As a part of the largest field experiment on precipitation, scientists will study the effects of electrical charges in the atmosphere on rainfall (Photo courtesy of NCAR).

- electrical charges in the atmosphere that can influence rainfall; and
- the amount of water processed by a cloud as compared to the amount of water that reaches the ground.

NCAR scientists expect the data analysis to require 2 to 4 years.

Although the project is centered at HIPLEX, High Plains Cooperative Program in cloud seeding research, CCOPE will involve no cloud seeding itself. However, CCOPE is 'an important step in improving prediction of severe growing-season storms and in assessing and realizing the full potential of cloud seeding,' Hess added.

The experiment, run by NCAR, is funded by the National Science Foundation, through the University Corporation for Atmospheric Research, and by the Interior Department's Water and Power Resources Service. Also involved are the National Oceanic and Atmospheric Administration, the National Aeronautics and Space Administration, and the state of Montana. NSF also contributes support to CCOPE through research grants to universities. Patrick Squires at NCAR and Bernard Silverman at Water and Power are co-directors of CCOPE.—*BTR* ⊠

Women Geoscientists Publish Directory

If you're a woman geoscientist and you weren't listed in the second edition of the *Roster of Women in the Geosciences Professions*, published in 1978 by the Women Geoscientists Committee of the American Geological Institute, you have until September 1 to be included in the directory's third edition, scheduled for publication in late 1981.

The roster is open to all professional women employed in any aspect of geosciences, according to Laurie Brown, committee chair. To be listed in the roster, you need to fill out a data form from the AGI Women Scientists Committee, 5202 Leesburg Pike, Falls Church, VA 22041.—BTR ⊠

New Publications

The Seaward Margin of Belize Barrier and Atoll Reefs

Noel P. James and Robert N. Ginsburg, John Wiley, New York, xi + 191 pp., 1979, $22.95.

Reviewed by Gerald M. Friedman

Any publication on carbonate rocks will be in demand today; after all, more than half of all recoverable oil and gas reserves occur in carbonate rocks. Models for interpreting these rocks in the rock record, especially carbonate platforms and reef complexes which contain such reserves, must be based on a thorough study of modern analogues. Only in a modern setting are the processes of sedimentation resulting in carbonate sequences amenable to scientific scrutiny and analysis.

This book is a pioneering document on shelf-edge sedimentation in a modern reef complex. Its model is the fore-reef zone of the barrier and atoll reefs of Belize in Middle America, a study based on direct observations and sample collections from a submersible; seismic profiling and examination of piston cores complement and supplement this study, but it is the direct observations and in situ sample collection at water depth down to more than 300 m below sea level which make this study unique. Observations and sample collections on dives have provided detailed new data on different kinds and ranges of carbonate-secreting organisms, morphology of the fore-reef zone, and the distribution of sedimentary particles and cements along the reef front.

In eight chapters, James and Ginsburg trace their model from an initial description of the geologic setting of the Belize reefs to the geophysical anatomy and morphology of the continental margin and the sediments and organisms of the barrier reef and forereef, to composition and age relationships, and ultimately to sedimentation and diagenesis along the deep seaward margin and how all of these features relate to the Late Quaternary evolution of reef margins.

This interesting study provides new insight into the makeup of modern carbonate deposits, including reefs; the submersible reveals the hidden world of the fore-reef front, especially the interplay of organisms, sedimentary particles, and cements. This book is a unique yet mostly descriptive effort in carbonate and sedimentological research.

Those planning to integrate this new input of knowledge into the rock record must exercise caution. The dictum, 'the present is the key to the past,' has been replaced by a new motto, 'the present is the key to geological processes, and geological processes are the key to the past.' Thus this publication suffers under constraints: The described geologic setting reflects the waxing and waning of glacial and interglacial events, including the Late Pleistocene and Holocene transgression. By contrast, carbonates in the rock record are for the most part the result of sedimentation in epeiric and pericontinental seas—far removed from the almost anomalous cycles of the Quaternary epoch. If we were currently living in the Cretaceous period, this kind of study would have provided more relevance because the Cretaceous is a more representative sample of the rock record than the anomalous Quaternary. Hence for a geoscientist to apply the findings of James and Ginsburg to the rock record he or she must be sophisticated enough to separate the relevant from the inapplicable. Only geologic processes serve as the key to the past, whereas the conditions is nonrepresentative of most of the rock record and may complicate and mislead geologic interpretation.

Gerald M. Friedman is with the Department of Geology at Rensselaer Polytechnic Institute, Troy, New York.

New Listings

Items listed in New Publications can be ordered directly from the publisher; they are not available through AGU.

Antennas in Matter: Fundamentals, Theory, and Applications, R. W. P. King and G. S. Smith, MIT Press, Cambridge, Mass., xvi + 868 pp., 1981, $75.00.

Manual of Photogrammetry, 4th ed., C. C. Slama (Ed.), American Society of Photogrammetry, Falls Church, Va., xv + 1056 pp., 1981, $59.95.

Proceedings of the International Conference on Engineering for Protection from Natural Disasters, P. Kanasuthi, A. S. Balasubramaniam, W. Kanok-Nukulchai (Eds.), John Wiley, New York, xl + 937 pp., 1981, $101.00.

Remote Sensing of Atmospheres and Oceans, A. Deepak (Ed.), Academic, New York, xiv + 641 pp., 1980, $46.00.

Studies in East Asian Tectonics and Resources, Joint CCOP-IOC Working Group on SEATAR, CCOP, Bangkok, Thailand, viii + 257 pp., 1980. (Available from CCOP, Bangkok, Thailand.)

Surficial Geology: Building with the Earth, J. E. Costa and V. R. Baker, John Wiley, New York, ix + 498 pp., 1981, $24.95.

The Geophysical Directory 1981, The Geophysical Directory, Inc. Houston, Texas 584 pp., 1981, $15.00.

The Hurricane and Its Impact, R. H. Simpson and H. Riehl, Louisiana State University Press, Baton Rouge, Louisiana, xiv + 398 pp., 1981.

The Ore Minerals and Their Intergrowths, 2nd ed., vols. 1 and 2, P. Ramdohr, Pergamon, New York, xxxvii + 1174 pp., 1980, $200.00.

The Upper Atmosphere and Solar-Terrestrial Relations: An Introduction to the Aerospace Environment, J. K. Hargreaves, Van Nostrand Reinhold, New York, xv + 293 pp., 1979, $39.50.

Classified

EOS offers classified space for Positions Available, Positions Wanted, and Services, Supplies, Courses, and Announcements. There are no discounts or commissions on classified ads. Any type that is not publisher's choice is charged for at display rates. EOS is published weekly on Tuesday. Ads must be received in writing on Monday 1 week prior to the date of the issue required.

Replies to ads with box numbers should be addressed to: Box ___, American Geophysical Union, 2000 Florida Avenue, N.W., Washington, D.C. 20009.

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12-26 times—$1.75

STUDENT OPPORTUNITIES
For special rates, query Robin Little, 800-424-2488.

POSITIONS AVAILABLE

Meteorite Research at UCLA. Applications are invited for a postdoctoral position, salary about $18,000 per year. The job duties involve experimental and theoretical studies relating to the origin of meteorites. Requirements for the position are a science Ph.D. and a minimum of 2 years meteorite research experience. Send resumé to J. T. Wasson, Institute of Geophysics and Planetary Physics, University of California, Los Angeles 90024.

UCLA is an affirmative action/equal opportunity employer.

Research Seismologist. The Alexandria Laboratories of Teledyne Geotech invites applications from Ph.D.-level seismologists to work on problems related to the comprehensive and threshold test ban treaty negotiations. Applicants should have background in such topics as theoretical seismology, seismic data analysis, seismic data gathering, advanced scientific computing, and computer systems. To apply please send your resume to Jean Hill, Personnel Department, Teledyne Geotech, 314 Montgomery Street, Alexandria, Virginia 22314.

An equal opportunity employer.

Louisiana State University. The Department of Geology anticipates one or more temporary positions at the assistant professor or higher level will be available in the fall or spring semesters 1981–82. Applications in any field of geology or geophysics will be considered. The Ph.D. is required. There is a possibility of the positions becoming tenure track. Applicants should submit a vita, reprints, a statement of teaching and research interests, and arrange for three letters of recommendation to be sent to Dr. R. H. Pilger, Jr., Chairman, Search Committee, Dept. of Geology, LSU, Baton Rouge, LA 70803. Application Deadline July 15, 1981.

LSU is an equal opportunity affirmative action employer.

Postdoctoral/Research Associate Positions, The Johns Hopkins University, Applied Physics Laboratory. Positions are available for studies of magnetospheric-ionospheric coupling, hydromagnetic waves, and plasma instabilities in the ionosphere and magnetosphere. The selected candidates will participate in the analysis and interpretation of data from spacecraft and ground-based radars as well as in the development and implementation of new ground-based and spacecraft studies. Positions are for one year and are renewable. Tenure may begin at any time through September 1, 1981. Applications should be addressed to Mr. Steven F. Sayre, Jr., Dept. KDI-15, The Johns Hopkins University, Applied Physics Laboratory, Johns Hopkins Road, Laurel, MD 20810.

An equal opportunity employer, m/f.

Biogeochemist or Organic Geochemist. Research assistant professor with interest in organic matter cycling in coastal sediment systems, as part of interdisciplinary group. Academic year appointment with opportunity for renewal. Resume, names of three references, and letter of research interests by July 1 to L. Mayer, Ira C. Darling Center, University of Maine at Orono, Walpole, Maine 04573.

Equal opportunity/affirmative action employer.

Postdoctoral Position/UCLA. Postdoctoral position in experimental geochemistry/petrology available immediately for research on lower-crust/upper-mantle problems. Successful applicant will have a strong background in theromodynamics and petrology. Send application to Art Boettcher, Institute of Geophysics & Planetary Physics, University of California, Los Angeles, California 90024.

UCLA is an equal opportunity/affirmative action employer.

Structural Geology/University of Illinois at Champaign-Urbana. The Geology Department is seeking a structural geologist for a tenure-track (assistant professor) faculty position. A Ph.D. is required. Salary open. The successful candidate will be expected to teach advanced undergraduate and graduate courses in structural geology and establish a research program. For equal consideration, applications, including the names of three references, should be sent by August 1, 1981 to Dr. D. E. Anderson, Department of Geology, University of Illinois, 245 Natural History Building, 1301 West Green Street, Urbana, IL, 61801, (217) 333-6713. Position to be filled by 1-1-82.

The University of Illinois is an affirmative action/equal opportunity employer.

Mineralogy and Petrology. Applications are invited for a faculty position at Weaber State College, effective September 1981. This is a permanent faculty position with rank, salary, and tenure track status determined by qualifications. Responsibilities include teaching undergraduate courses in mineralogy, petrology, and geochemistry and some combination of mineral deposits, structural geology and introductory geology. Ph.D. preferred. WSC is a large (10,000 students) undergraduate college with a strong geology program graduating about 10–15 majors per year. The college is situated in northern Utah at the boundary between the Rocky Mountain and Great Basin Provinces and adjacent to the Overthrust Belt. The Department is well equipped for field-oriented teaching and research. The closing date for applications is July 1, 1981. Applications, including evidence of teaching proficiency and the names of three references should be sent to S. R. Ash, Chairman, Department of Geology/Geography, Weaber State College, 3750 Harrison Blvd., Ogden, Utah 84408.

An equal opportunity/affirmative action employer, M/F.

Physical Oceanographer. The Pacific OCS Office, Bureau of Land Management, is seeking qualified candidates for a staff oceanographer to supervise contracted marine environmental research. The primary areas of research will be physical oceanography and meteorology. Duties include serving as a contracting officer's authorized representative, developing study plans and work statements and advising management on matters within the candidate's area of expertise. Grade level: GS 9/11/12, salary $18,585–26,951. Send a current SF 171 by June 8, 1981 to Administrative Officer, Bureau of Land Management, 1340 W. Sixth St., Rm 200, Los Angeles, CA 90017. For more information, call 213-688-7120.

Research Position in Chemical Oceanography. California Institute of Technology, Division of Geological and Planetary Sciences. The position of research fellow is being offered at Caltech for research in oceanography. Investigation of the isotopic composition of neodymium and rare earth abundances in sea water and sediments is now being carried forward. The mechanism of injection of REE into sea water will be studied. The differences in $^{141}Nd/^{144}Nd$ in various water masses (Piepgras *et al.*, Earth and Planet. Sci. Lett. 45, 223–236 and Piepgras and Wasserburg, Earth and Planet. Sci. Lett 50, 128–138 (1980)) is now being carried forward as an exploratory venture in order to determine the origin and chemical behavior of REE in the ocean and the potential use of $^{141}Nd/^{144}Nd$ as a tracer. The laboratory facilities for sample preparation and analysis are fully functional and will be available. Applicants should have training in oceanography and a good perspective on general physical oceanographic models.

Send resume and references to Professor G. J. Wasserburg, Lunatic Asylum, California Institute of Technology, Pasadena, CA 91125.

Caltech is an equal opportunity/affirmative action employer (M/F/H).

Faculty Position/University of Alaska, Fairbanks. Applications are invited for a tenure track faculty position in economic geology in the Geology/Geophysics Program to teach undergraduate and graduate courses in ore deposits, mineralogy, and exploration geology.

Applications should have demonstrated practical experience in mineral exploration, regional and detailed geologic mapping as well as a commitment to research in the genesis of ore deposits. The candidate will be expected to pursue a vigorous graduate teaching and research program in economic geology with students primarily oriented toward careers in the mineral industry.

Preference will be given to individuals with experience in arctic or subarctic minerals research and a record of close collaboration with the mineral industry. Academic rank and salary commensurate with experience. Ph.D. required.

Send resume and three letters of reference Director, Division of Geosciences, University of Alaska, Fairbanks, Alaska 99701. Applications will be accepted until June 30, 1981, or until filled.

The University of Alaska is an equal opportunity/affirmative action employer.

Research Associate/Theoretical Physical Oceanography. Applications invited for a postdoctoral research associate position in the School of Oceanography, Oregon State University. Applicant will conduct research in theoretical modeling and observational comparisons of coastal upwelling, upper ocean mixing and/or equatorial ocean circulation. Ph.D. in mathematics or the physical sciences. Submit resume, brief statement of research interests, and three references by 1 July 1981 to Dr. James Richman, School of Oceanography, Oregon State University, Corvallis, Oregon 97331.

OSU is an Affirmative Action/Equal Opportunity Employer.

Crustal Seismology: Princeton University. Candidates with an interest in any of the following are invited to apply for research staff appointments:

1. Marine seismic data analysis and structure of oceans and ocean margins.
2. Narrow and wide angle reflection seismology applied to continental crustal geology.
3. Wave propagation theory and techniques of seismic data analysis.

Princeton University has an ongoing program for the creative reanalysis of existing multichannel reflection data—such as COCORP and USGS offshore data. Special projects are undertaken from time to time to collect field data in critical areas or to test new methods of data collection and analysis. A high performance 32 bit minicomputer system for data analysis and theoretical work is to be installed later this year.

Applicants should send curriculum vitae and a list of three references to:

Robert A. Phinney
Department of Geological and Geophysical Sciences
Princeton University
Princeton, NJ 08544

Or inquire: 609-452-4118.

Date of appointment and salary are negotiable.

Princeton University is an equal opportunity employer.

Physical Oceanographyt University of Rhode Island. A postdoctoral research associate position is available for studies of tropical processes in the Pacific. The selected candidate will participate in the collection and analysis of data relating to the dynamic topography and heat content of the equatorial current systems as part of a long-term study of ocean influences on climate. Opportunities exist for developing models to be evaluated with the acquired data, or to help with moored instrument and experimental design. Submit resume and professional references by June 15, 1981 to: Dr. D. Randolph Watts, Graduate School of Oceanography, UNIVERSITY OF RHODE ISLAND, Kingston, RI 02881

An affirmative action/equal opportunity employer, M/F.

Geophysicist. Applications are invited for a tenure track position in geophysics for the 1981–82 academic year. The Ph.D. in geophysics or a closely related field is required.

We are seeking a candidate capable of teaching undergraduate and graduate courses and supervising graduate research in seismic exploration geophysics. Specific research interests need not be in that area. Applications are encouraged from individuals with industrial experience.

Applicants should submit a resume and three letters of recommendation to Dr. Mold U. Ahmad, Chairman, Department of Geology, Ohio University, Athens, Ohio 45701.

Ohio University is an equal opportunity/affirmative-action employer.

Atmospheric Scientist/Radiation Physicist. Current Applied Research and Systems activities have created immediate openings in the following areas:

1. Spectroscopy, Radiative Transfer and Atmospheric Sciences (1 Position) Requires to work on the general circulation modeling of stratosphere.
2. Atmospheric Fluid Dynamics (1 Position). Requires to develop global atmospheric dynamics problem in the thermosphere.

These positions are in support of science and application tasks of NASA/Goddard Space Flight Center, Greenbelt, Maryland and require one to work onsite.

An extensive background in the numerical simulation of physical problems by use of mini and large computers is required. Candidates must have M S or Ph D. in atmospheric sciences or physical sciences. Both of these positions are renewable up to two years.

Salary range is $21,000 to $35,000 per annum, depending on qualifications. Good Benefits. Qualified applicants should send three references, salary history and requirements to

Dr S P S Anand
Applied Research and Systems
8401 Corporate Drive
Suite 650
Landover, MD 20785
Telephone (301) 459-8442

Postdoctoral Position/ASU. Possible postdoctoral position in the fall of 1981 for work on thermodynamics of silicate melts and glasses including (a) solution calorimetry at atmospheric pressure and 710° C of anhydrous glasses, (b) drop calorimetry, at 0.5 to 2 kbar, of hydrous (granite system) glasses and melts, including equipment development, and (c) model calculations of melt thermodynamics. Salary in the $14,000–$15,000 range depending on experience, starting date is negotiable. Initial appointment is for one year, second year likely if mutually agreeable. For information contact: A Navrotsky, Department of Chemistry, Arizona State University, Tempe, Arizona 85281, (602) 965-4241

DEAN
MACKAY SCHOOL OF MINES
UNIVERSITY OF NEVADA, RENO

Mackay School of Mines is a century-old academic unit of the University of Nevada, Reno, granting graduate and undergraduate degrees in the departments of Geological Sciences, Mining Engineering, and Chemical & Metallurgical Engineering.

The Research/Public Service components of the School are: Nevada Bureau of Mines and Geology, Mackay Mineral Research Institute, Nevada Mining Analytical Laboratory, and the Seismological Laboratory.

The Dean is responsible for leadership and coordination of: the education, research, and public service functions; promotion (including fund raising) of the school; programs with groups inside and outside the university.

The Dean should have: an earned doctorate and be tenurable within one of the departments of the school; a significant record of teaching, research, and publication; the demonstrated ability to procure outside funding; evidence of sufficient academic, industrial, or governmental administrative experience to provide leadership for the educational, research, and public service units of the school.

The preferred starting date is January 1, 1982, but candidates who cannot start until July 1, 1982, will be considered.

Candidates must submit a letter of application, curriculum vitae, and the names and addresses of five references before July 1, 1981, to

Chairman, Dean Search Committee
Mackay School of Mines
University of Nevada, Reno
Reno, Nevada 89557

EEO/AA employer.

Consejo Nacional de Investigaciones Cientificas y Técnicas

CHIEF OCEANOGRAPHER

A postdoctoral scientist with several years experience in physical oceanography is required at IADO (Instituto Argentino de Oceanografia), a joint institution of the Consejo Nacional de Investigaciones Cientificas Y Técnicas (National Research Council), the Universidad del Sur, Bahía Blanca, and the Armada Argentina (Argentine Navy).

The applicant, in addition to research and postgraduate teaching in his own field, will also be responsible for the planning, coordination, and supervision of activities in other branches of oceanography at large.

The position is under the auspices of a joint program of the Consejo Nacional de Investigaciones Cientificas y Técnicas (CONICET) and the Interamerican Development Bank (IDB). It will be initially of medium duration, and is renewable.

It will be located at Bahía Blanca. Salary and fringe benefits according to qualification. Knowledge of Spanish language will be considered an advantage. For consultations or submitting applications, contact:

Señor Presidente del
Consejo Nacional de Investigaciones
Cientificas y Técnicas
Avda. Rivadavia 1917
(1033) Buenos Aires, Argentina.

Applications should include complete academic and professional background along with a list of publications as well as names and addresses of three references.

Seismology. Research associate position anticipated (September 1, 1981), telemetry monitoring project in Virginia Problems focus on seismicity and neotectonics in the state. Prefer M.S geophysicist with thesis in observational seismology, but others considered Applications, transcripts and two letters of recommendation to Dr. G. A. Bollinger, Seismological Observatory, VPI&SU, Blacksburg, Virginia 24061 Deadline for receipt of applications is August 1, 1981.

VPI&SU is an equal opportunity affirmative action employer.

University of Leeds-Isotope Geochemist. Applications are invited for a temporary appointment for a fixed term of up to two years as postdoctoral research fellow in the Department of Earth Sciences, from a date to be arranged, to work on a project in isotope geochemistry and geochronology, funded by the Natural Environment Research Council, UK.

Preferred special interests and experience are expected in radiogenic isotope geochemistry applied to petrogenetic studies and or mantle evolution Current isotopic research includes investigations into specific intra-plate and island-arc volcanic provinces, mantle nodules, Precambrian geochronology, thermal evolution of metamorphic belts, and sea-water sediment interactions

Salary within the range £6070–£10,160 on the fA Scale for Research and Analogous Staff (£6070–£10,575) according to age, qualifications and experience

Informal enquiries may be made to Professor J C Briden. Further particulars and application forms (if desired) may be obtained from the Registrar, The University, Leeds LS2 9JT, U.K., quoting reference number 49/16/HG. Closing date for applications 31 May 1981.

Research Fellow/Sedimentary Geochemistry. The Australian National University invites applications for appointment as research fellow in sedimentary geochemistry, Research School of Earth Sciences. The School has a well equipped trace element laboratory, including an MS7 Spark Source Mass Spectrometer, with access to electron microprobe and XRD facilities.

The successful applicant should hold a Ph.D. degree and have a good background in geology, geochemistry, analytical chemistry, sedimentology and Pre Cambrian geology and should have experience in the use of the above analytical techniques.

He or she will be expected to participate in joint research projects dealing with the use of trace element geochemistry in elucidating the composition and evolution of the Earth's crust through studies of sedimentary rock sequences.

In addition, applicants are invited to submit research proposals detailing the general research directions and specific projects which they would wish to pursue. Further information concerning the position can be obtained directly from Dr. S. R. Taylor.

Applicants should submit a detailed curriculum vitae, a publications list and the names and addresses of three referees.

Appointment as research fellow will be up to three years in the first instance with the possibility of extension to five years. Salary range: $A19132 to $A24972 per annum ($A1 = $US1.14). Superannuation, housing assistance, reasonable appointment costs.

The University reserves the right not to make an appointment or to make an appointment by invitation at any time.

Applications should be sent to The Registrar, The Australian National University, PO Box 4, CANBERRA, ACT 2600, AUSTRALIA by 3 AUGUST 1981.

SERVICES

Scripps Remote Sensing Tutorials.

1A. *Overview of the Remote Sensing Facility*—This one-day seminar describes the data bases, sources and processing capabilities available at Scripps Institution of Oceanography, Remote Sensing Facility A morning lecture will introduce past, current and future space platforms available for observation of the Oceans. A brief discussion of where and how to access this information will conclude the first part of the class.

The afternoon will include a demonstration of processing and displaying imagery obtained from TIROS-N, NOAA-6 and NIMBUS-7

Classes will be held at the Helen Raitt Room SIO Library on Monday, April 20, 1981 and Monday, July 27, 1981, at 8 30 am. A nonrefundable fee of $50.00 must be submitted with the application. Enrollment limit—12.

2A. *Users Introduction to the Scripps Remote Sensing Facility*—This four-day workshop is intended exclusively for individuals who will be using the facility at Scripps. Two morning lectures will describe in detail the hardware, software and personnel resources available to oceanographers. Existing data bases, their characteristics, location, mode and cost of access will be covered. Basics of image processing will be introduced along with in-depth look at the Interactive Digital Image Manipulation System used at the SRSF.

The two lectures will be followed by afternoon lab sessions which consist of hands-on exercises to familiarize users with the hardware/software at the facility. The third morning will be devoted to train users in realtime spacecraft tracking and data recording and acquisition.

The remainder of the 3rd day and the entire 4th day will be used to work with users on a one-to-one basis. Attendees are encouraged to bring their own digital tapes with data of interest to them, which can be used during this last portion of the workshop.

Classes will be held in the Helen Raitt Room SIO Library starting on Tuesday, April 21, 1981 and Tuesday, July 27, 1981 at 8:30 am. A fee of $335.00 must be submitted with each application. Enrollment limit—6.

For more information regarding applications, fees, etc., please contact University of California at San Diego, SRSF/SIO, Mail Code A-030, La Jolla, California 92093 or (714) 452-2292.

SUPPLIES

Rock Hammer with pick head and leather holster for $16.00. This is $6.00 below list price. Write for free catalog "Geologic Field Supplies and Prospecting Equipment". Western Heritage, 101 S. Washington St., Hinsdale, IL 60521. Telephone (312) 964-5228.

STUDENT OPPORTUNITIES

Graduate Students Research Assistantships, St. Louis University, Paleomagnetic Laboratory. Two positions are open for paleomagnetic research work conducted under NSF sponsorship. The positions are for one year and are renewable. The candidates are expected to apply simultaneously for admission to graduate school to pursue studies leading to a MS and/or Ph.D. degree in geophysics. For more information, contact: Dr. S. A. Vincenz, Department of Earth & Atmos. Sciences, St. Louis University, P.O. Box 8099-Laclede Sta., St. Louis, MO 63156, Telephone (314) 658-3128 and simultaneously, Dean of Graduate School, St. Louis University, 221 N. Grand Blvd., St. Louis, MO 63103.

AGU

Report to Council—May 24, 1981

President J. Tuzo Wilson launched the 5-year financial appeal, known as AGU-GIFT, at the Council meeting in San Francisco last December. Wilson appointed Earl Droessler and Charles Whitten to serve as cochairmen of a steering committee under the general guidance of the AGU Financial Resources Committee.

AGU GIFT 1980 1985

At that Council meeting, Wilson asked Whitten to present the general strategy for the campaign.

An all-U.S.-member mailing of a brochure and pledge card was made in December to provide a year-end opportunity to make tax-deductible gifts. The response was modest, initial gifts ranging from $10 to $2000. Droessler and Whitten have been proceeding with the formation of the steering committee, consisting primarily of persons in the Washington area. Tom Aldrich, Waldo Smith, Erick Schonstedt, Brackett Hersey, Fred Spilhaus (ex-officio), and Cynthia Bravo, staff support, have been meeting with us about every 4 weeks to develop plans and review progress. James Van Allen (AGU President-Elect) has indicated an interest in meeting with us as long as he is in the Washington area. Recently, John Reed volunteered to be a member and will be developing plans for 'Deferred giving'—bequests, trusts, etc.

Erick Schonstedt offered to mail personal letters to all AGU members in northern Virginia (approximately 400), urging them to 'invest in the future of AGU.' If this approach seems feasible, we hope to find other members who will do the same thing in their areas.

Droessler and Whitten have been meeting with a few of the senior members who live in the Washington area, reviewing lists of Life Members, Fellows, etc., in the various sections in an effort to identify potential 'visitors' for 'prospective donors.' This process requires considerable correspondence, but we believe that a 'one-on-one' approach produces the maximum results. We intend to continue this for all sections.

The overall response from the membership thus far cannot be described as 'outpouring.' However, there are some significant aspects. It is understandable that some individuals do not wish to sign 'pledge cards.' Approximately half the respondents have made direct contributions. The average contribution during the first 5 months is slightly under $200. The 5-year pledges vary from $10 to $10,000. The ages of the contributors are from the 20's to those well past 80 and approaching 90. As of May 1st there were 67 responses, with cash contributions of $12,020. The total pledges, including the cash, is $31,365.

The steering committee is 100% committed to this program and greatly appreciates the assistance and support shown by others. We are following professional advice—the only cost being the purchase of a few books. We particularly like the philosophy of one of the authors—'Think big. No one has ever been offended when asked to make a large gift. People are flattered by this expectation by a solicitor; they may not give what is asked, but they will make generous contributions.'

The support of the membership by section affiliation is given below:

Section	*Response*	*Pledges*	*Paid (as of May 1st)*
Geodesy	6	$11,250	$3,480
Geomagnetism and Paleomagnetism	5	1,850	1,630
Hydrology	9	3,135	850
Meteorology	13	125	2,755
Oceanography	4	625	235
Planetology	2		35
Seismology	6	450	270
Solar-Planetary Relationships	8	300	1,255
Tectonophysics	11	6,200	1,400
Volcanology, Geochemistry, and Petrology	3		110
Totals	67	$23,935	$12,020

Total (Cash plus unpaid pledges): $31,365

Earl G. Droessler
Charles A. Whitten
Cochairmen, Steering Committee

Hydrology Day

Registration for the Hydrology Day sponsored by the Front Range Branch of AGU on April 23 at Colorado State University in Fort Collins, Colorado, totaled 121 participants, of whom 61 were students.

Thirty-one individuals joined the Front Range Branch. Three students from Colorado State University won the awards for best paper in their category: Thomas W. Anzia (Sr.), 'A Comprehensive Table of Standard Deviates for Confidence Limits on Extreme Events;' Victor Nazareth (M.S.), 'Aquifer Properties from Single-Hole Aquifer Tests;' and Roy W. Koch (Ph.D.), 'A Physically Based Derivation of the Distribution of Excess Precipitation.' Judges for the awards were Dr. Bittinger, Resource Consultants, Fort Collins; George Leavesley and Daniel Bauer, USGS, Water Resources Division, Denver; Scott Tucker, Executive Director, Denver Urban Drainage and Flood Control District; Charles Brendecke, Department of Civil Engineering, Univ. of Colorado, Boulder.

The event was planned and organized by H. J. Morel-Seytoux, Department of Civil Engineering, Colorado State Univ., with the assistance of the Front Range Branch executive committee: Dean Kleinkopf, chairman; Allen W. Hittman, secretary; Selena Billington, treasurer; members at large: H. H. Sargent, K. L. Svendsen, John Costa, and Martin F. Kane and Joe Allen, past chairmen.

Chairing the various sessions from CSU were: T. G. Sanders, Civil Engineering Department; D. D. Doehring, D. W. Striffler, and H. S. Boyne from the Earth Resources Department; R. E. Smith from USDA-SEA-AR, Fort Collins. Luncheon speaker was R. A. Longenbaugh, Assistant State Engineer, Colorado Division of Water Resources, who spoke on the 'Importance of Hydrology in the Water Decisions of the State.'

This report was contributed by H. J. Morel-Seytoux, Professor of Civil Engineering at Colorado State University.

AGU Scholars

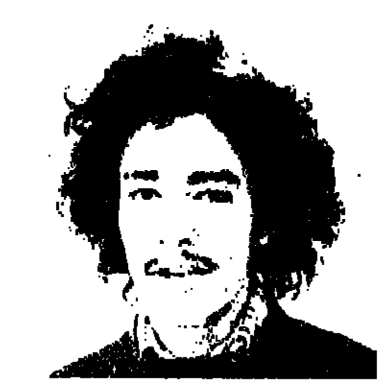
In recognition of the strong support of the American Geophysical Union and its substantial contribution to the American Geological Institute's Minority Scholarship Program, 11 of the 1980–1981 scholarship recipients were designated 'AGU Scholars.' Of this group, three were designated AGU 'Sea Grants Scholars' because they were funded through a matching grant from the National Oceanic and Atmospheric Administration Sea Grant Program, which is aimed at increasing the numbers of minority students studying in fields related to developing marine and coastal research.

The AGU Scholars and Sea Grant scholars are engaged in courses of study relating to broad areas of interest to the Union. David Butler is a geophysics student at the University of South Florida; Gary Gutierrez is a geophysics student at the University of Wetlands; Clarence Hairston is a hydrogeology student at Iowa State University; Joseph Hayden is a geophysics student at the University of Oklahoma; Marisa Quiñones is a geophysics student at Hunter College; Philip Solano is a meteorology student and David Trujillo is a geophysics student at New Mexico Highlands University; and Howard West is a geophysics student at the University of Hawaii. The AGU Sea Grant Scholars are Dawn Wright, an oceanography student at Wheaton College; Adolph Requejo, a marine geology student at the University of Rhode Island; and John Zucker, a marine geology student at California Polytechnic Institute. Hayden, Requejo, Trujillo, and Zucker have been AGU scholars in prior years.


Joseph Hayden


Marisa Quiñones


Adolpho Requejo


David Trujillo


Howard West


Dawn Wright


John Zucker

Meetings

Impact of Richards' Equation

A day-long session entitled 'Impact of Richards' Equation: A Semi-Centennial Session' will be held during the AGU Fall Meeting in San Francisco, December 7–11. The session's invited and contributed papers will explore the theoretical aspects, laboratory studies, field applications, and mathematical solutions to the equation proposed in 1931 by L. A. Richards for the transient flow of water in partially saturated soils.

Prospective contributors should send an abstract of their paper by July 1 to T. N. Narasimhan, chairman of Special Session, Earth Sciences Division, Lawrence Berkeley Laboratory, Berkeley, CA 94720. Authors of accepted papers will be notified by August 1. An original and two copies of abstracts of accepted papers must be sent by September 16 directly to Meetings, AGU, 2000 Florida Avenue, N.W., Washington, D.C. 20009.

The session, organized by AGU's Hydrology Section, is cosponsored by the American Society of Civil Engineers, the Geological Society of America, the Soil Science Society of America, and the American Society of Agricultural Engineers.

New Listings

The complete Geophysical Year listing last appeared in the April 28 *Eos*.

Boldface indicates meetings sponsored or cosponsored by AGU.

1981

June 29–July 3 Conference/Workshop on Heterogeneous Catalysis—Its Importance to Atmospheric Chemistry, Albany, N.Y. Sponsors, NSF, NASA. (V. A. Mohnen, Atmospheric Sciences Research Center, State Univ. of New York, Albany, NY 12222.)

Aug. 9–18 International Congress of Surveyors, F.I.G., Montreux, Switzerland; Sponsor, Fédération Internationale Des Geometres. (American Congress on Surveying and Mapping, 210 Little Falls Street, Falls Church, VA 22046.)

August 20–21 Second International Symposium on Computer-Aided Seismic Analysis and Discrimination, North Dartmouth, Mass. Sponsors, IEEE Computer Society, IEEE Acoustics, Speech, and Signal Processing Society, Pattern Recognition Society, IEEE Geoscience and Remote Sensing Society, Electrical Engineering Department at Southeastern Massachusetts University. (C. H. Chen, Electrical Engineering Department, Southeastern Mass. Univ., North Dartmouth, MA 02747.)

Aug. 25–27 The Royal Institution of Chartered Surveyors Centenary Celebration, London, England. (Representative Radlinski, American Congress on Surveying and Mapping, 210 Little Falls Street, Falls Church, VA 22046.)

Sept. 8–12 American Society of Photogrammetry-American Congress on Surveying and Mapping Fall Convention, San Francisco, Calif. (L. W. Aggers, USGS, 345 Middlefield Road, Mail Stop 31, Menlo Park, CA 94025.)

Oct. 11–14 Coastal Society's Seventh Annual Conference, Galveston, Tex. (N. West, Coastal Society Conference, Department of Geography and Marine Affairs, Univ. of Rhode Island, Kingston, RI 02881.)

Oct. 13–15 Fifth Geopressured-Geothermal Energy Conference, Baton Rouge, La. Sponsors, Louisiana Geological Survey, Department of Natural Resources; Energy Programs Office, Louisiana State University; U.S. Department of Energy. (Ann Bachman, Conference Coordinator, Energy Programs Office, 105 Hill Memorial, Louisiana State Univ., Baton Rouge, LA 70803.)

Oct. 14–16 Colloquium III on Petroleum Mapping and Surveys in the '80's, Banff, Alberta, Canada. Sponsor, Canadian Petroleum Association. (Liz Hampton, Canadian Petroleum Assoc., 1500, 633 Sixth Ave., S.W., Calgary, Alberta, T2P 2Y5 Canada.)

Oct. 22–24 Fourth Conference on the Physics of the Jovian and Saturnian Magnetospheres, Laurel, Md. Sponsor, NASA. (S. M. Krimigis, Applied Physics Laboratory, Johns Hopkins Univ., Laurel, MD 20810.)

November 1–5 Sixth Biennial International Estuarine Research Conference, Gleneden Beach, Oreg. Sponsor,

AGU Spring and Fall Meetings
Future Dates and Hotel Rates

1981 Fall Meeting: December 7–11
Abstract deadline—September 16
San Francisco

Jack Tar Hotel and Holiday Inn/Golden Gateway
Single $41
Double $47

1982 Spring Meeting: May 31–June 4
Abstract deadline—early March
Philadelphia

Franklin Plaza		Philadelphia Sheraton	
Single	$48	Single	$41
Double	$58	Double	$51
Triple	$63	Extra Person	$10
Quads	$72		

Pacific Northwest Regional Meeting

September 17–18, 1981

Central Washington University
Ellensburg, Washington

Abstract Deadline: July 15

Special symposia will be held on 'The Tectonics of the Columbia Plateau and Other Neogene-Quaternary Faults of the Pacific Northwest;' 'Stratigraphy and Structure of the Cascade Range;' and 'Studies of the Eruption of Mount St. Helens.'

To submit an abstract, use standard AGU format (see page 20 of January 13 *Eos*).

Send the original plus two copies to Bob Bentley, Secretary-Treasurer, PNAGU, Central Washington University, P.O. Box 1000, Department of Geology, Ellensburg, Washington 98926.

If you are not an AGU member, or if you are an AGU member who lives outside the Pacific Northwest region, and you wish to attend, write to Bob Bentley to have your name put on the mailing list. The call was published in *Eos*, February 24.

Estuarine Research Federation. (Jay F. Watson, Treasurer, USFWS Suite 1962, 500 N.E. Multnomah Street, Portland, OR 92232.)

Dec. 3–5 Lunar and Planetary Institute Topical Conference on Processes of Planetary Rifting, San Francisco, Calif. (Rift Meeting, Projects Office, Lunar and Planetary Inst., 3303 NASA Road 1, Houston, TX 77058.)

1982

May 10–12 Fourth International Conference on Planning and Management of Water Resources for Industrial, Agricultural, and Urban Use, Marseilles, France. Sponsors, Commission Européenne Mediterranéenne de Planification des Equx (C.E.M.P.E.), Société des Eaux de Marseille (S.E.M.), the Bureau de Recherches Géologiques et Minières (B.R.G.M.), Centre de Formation Internationale à la Gestion des Ressources en Eau (CEFIGRE), UNESCO, Commission des Communautés Européennes, Association des Hydrogéologues (AIH). (Secretariat de la Conference, Societe des Eaux de Marseille, 25 rue Edouard Delanglade—13006 Marseille, France.)

May 25–28 **Symposium on the Composition of Nonurban Troposphere,** Williamsburg, VA. Sponsors, AMS, NASA, AGU. (Jack Fishman, Mail Stop 401-B, NASA Langley Research Center, Hampton, VA 23665.)

June 13–17 International Symposium on Hydrometeorology, Denver, Colo. Sponsor, American Water Resources Association. (A. I. Johnson, Woodward-Clyde Consultants, 2909 West 7th Ave., Denver, CO 80204.)

June 15–18 **International Conference on Rainwater Cistern Systems,** Honolulu, Hawaii. Sponsors, University of Hawaii's Water Resources Research Center, AGU. (Yu-Si Fok, General Conference Chairman, Water Resources Research Center, Univ. of Hawaii, 2540 Dole Street, Honolulu, HI 96822.)

Aug. 23–27 Second Symposium on Applied Glaciology, Hanover, N.H. Sponsor, International Glaciology Society. (Secretary General, International Glaciological Society, Lensfield Road, Cambridge CB2 1ER, United Kingdom.)

GAP

Separates

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Separates will be mailed within 3 weeks of journal publication or within 10 days if ordered after the journal has appeared. Separates are available for purchase for two years from date of publication.

Copies of English translations of articles from Russian translation journals are available either in unedited form at the time of their listing in EOS or in final printed form when a journal is published. The charge is $2.00 per Russian page.

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2000 Florida Avenue, N.W.
Washington, D.C. 20009

Aeronomy

0410 Aeronomy
OBSERVATIONS OF THE FAR ULTRAVIOLET NIGHTGLOW
P. Feresne (Space Sciences Laboratory, University of California, Berkeley, CA 94720)
The extreme ultraviolet telescope on the Apollo-Soyuz mission observed the far UV nightglow in the 1350-1700Å band from an altitude of 225 km at solar minimum in July 1975. [illegible]

[illegible]

field lines having an open topology. Here we point out that the magnitude of the H^+ flow velocity in the polar wind is not predicted by theoretical models but rather it is imposed as a boundary condition. Thermal diffusion, the electron temperature profile and a diverging magnetic field can be shown to have important effects on the H^+ flow velocity which need not be supersonic even when the pressure at large distances from the earth is low.
J. Geophys. Res., Blue, Paper 1A0742

0450 Pressure, density, and temperature
NON-THERMAL EQUILIBRIUM BETWEEN ELECTRONS AND NEUTRALS AT IONOSPHERIC E-REGION HEIGHTS.
S. Duhau (Departamento de Física, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, 1428, Buenos Aires, Argentina) and C. Azpiazu.
The results of measurements of electron temperature in the E-region by incoherent scatter radar and Langmuir probes are contradictory. To provide an additional empirical evidence a correlation is found between the collision frequency data obtained by the method of deviative absorption and $F_{10.7}$ (for a height of 110 km) at noon. A remarkable agreement is found between these results and those obtained with the collision frequencies calculated from temperatures measured with probes on quiet days. We conclude that, contrary to what is usually assumed, electrons and neutrals are not in thermal equilibrium in the E-region, the quotient between the electron and neutral gas temperatures (T_e/T_n) depends strongly on $F_{10.7}$, and that there is a mechanism whereby electrons are heated, totally localized in the E-region. (Electron temperature, non-thermal equilibrium, E-region, heating mechanisms)
Geophys. Res. Lett., Paper 1L0175

0450 Pressure, density, and temperature
THE EFFECT OF THE CHARGE EXCHANGE SOURCE ON THE VELOCITY AND 'TEMPERATURE' DISTRIBUTIONS AND THEIR ANISOTROPIES IN THE EARTH'S EXOSPHERE
R. R. Hodges Jr., R. P. Rohrbaugh, and B. A. Tinsley (University of Texas at Dallas, P.O. Box 688, Richardson, Texas 75080)
The velocity distribution of atomic hydrogen in the Earth's exosphere has been calculated as a function of altitude and direction using a Monte Carlo simulation which includes the classical exobase source and the higher altitude plasmaspheric charge exchange source. The charge exchange 'hot' hydrogen atom source produces the satellite component and 'hot' ballistic and escape components.
Velocity distribution functions F(v) have been plotted as log F(v) against v^2. For a Maxwellian velocity distribution the slope would be constant and inversely proportional to the defined temperature. For the classical exobase source alone the slope is constant only for the upward radial velocity component, and it increases dramatically as the altitude increases above one Earth radius for both the incoming radial and the two transverse velocity components. This 'temperature decrease' is the same effect as indicated in the analytical work of Chamberlain, due to the absence of the incoming-hyperbolic and flyby components of the particle distributions. The effect of charge exchange is to enhance the wings of the velocity distributions, especially for the upward-radial component. Charge exchange does not, however, succeed in overcoming the 'temperature decreases' in the incoming-radial and transverse directions at altitudes above one Earth radius. The gradients of the 'temperatures' and their anisotropies are great enough to engender some lack of confidence in the results of radiative treatments for Lyman α, which have been carried out so far on the basis of isothermal exospheric hydrogen models. (Exosphere, charge exchange, 'hot' hydrogen).
J. Geophys. Res., Blue, Paper 1A0684

0460 Tides, waves and winds
SIMULTANEOUS MEASUREMENTS OF METEOR WINDS AND GREEN LINE INTENSITY VARIATIONS : GRAVITY WAVES AND PLANETARY WAVES.
M. Teitelbaum (Service d'Aéronomie du CNRS, B.P. 3, 91370 Verrières-le-Buisson, France), M. Massebeuf, J.L. Fellous, M. Petitdidier, J. Christophe and F. Blanco.
We provide evidence of the influence of planetary waves on the intensity variations of the green line emission. The comparison relies on simultaneous measurements at four different stations located between 37°N and 54°N in latitude, 16°E and 3°W in longitude : meteor wind observations in France and USSR, optical measurements at 557.7 nm in France and Spain, in July, 1975. An oscillation of period near 2 days had been identified in the wind data ; it is also apparent on the nightglow intensity variations. Its characteristics are well accounted for by the first symmetric mode of the 52-hr period planetary oscillation of horizontal wave number 3 described previously.
A 4 ± 1 hr period gravity wave apparently present in the data of the French stations is discussed. (Planetary waves, gravity waves, green line, meteor winds).
J. Geophys. Res., Blue, Paper 1A0450

0460 Tides, waves and winds
LIDAR OBSERVATION OF GRAVITY AND TIDAL WAVES IN THE STRATOSPHERE AND MESOSPHERE
M.L. Chanin (Service d'Aéronomie du CNRS, BP 3, 91370 Verrières-le-Buisson, France) and A. Hauchecorne
Lidar measurements of atmospheric density and temperature in the altitude range 30 to 80 km have been performed during the last two years from the Observatory of Haute-Provence (lat. 44°N, long. 6°E). The potential of this technique for studying the middle atmospheric structure is presented and preliminary results on wave propagation are discussed. It is shown that wave-like structures are observed systematically in this height range. Fourier analysis indicates that most of the energy is transported by waves of vertical wavelengths on the order of 8 to 15 km. The amplitude of the density variations increase with height is shown to follow a $\rho^{-1/2}$ law up to 70 km. The characteristics of the observed density waves suggest that they are caused by a superposition of internal gravity waves propagating upwards from the troposphere and a diurnal tide component in the range 30 to 50 km. Such waves are able to induce quite significant perturbation in atmospheric density and therefore temperature on an hourly basis. The Lidar technique is able to monitor those variations for the first time from a ground station operating continuously. (Gravity waves, tides, middle atmosphere, lidar).
J. Geophys. Res., Green, Paper 1C0682

0460 Tides, waves and winds
DYNAMICAL REGIME OF THE LOWER THERMOSPHERE OVER EAST SIBERIA
E.S. Kazimirovsky (Siberian Institute of Terrestrial Magnetism, Ionosphere and Radio Propagation, Siberian Department, Academy of Sciences, Irkutsk, Lermontova-str. 126, USSR)
Some main results of experimental investigations of the dynamical regime of the lower thermosphere over East Siberia (85–95 km) are presented. Regular measurements of horizontal ionospheric drifts by the radio-physical method of closely spaced receivers by using a long wavelength transmitter operating at a frequency of 200 kHz have been carried out near Irkutsk during 1975-1979. The seasonal and interannual variations of the prevailing wind (zonal and meridional), and amplitudes and phases of semidiurnal tides are investigated. Planetary waves with periods 1-30 days and internal gravity waves with periods 20-80 min are found in the wind field. Comparison with results of analogous measurements in Central Europe reveals a longitudinal effect on the dynamical regime of the midlatitude lower thermosphere.
J. Geophys. Res., Green, Paper 1C0605

Electromagnetics

0720 Electromagnetic theory
NEW IMAGE REPRESENTATION FOR DIPOLES NEAR TO A DISSIPATIVE EARTH. PART II: DISCRETE PLUS CONTINUOUS IMAGES.
Samir F. Mahmoud (Electronic Engineering Department, Cairo University, Giza, Egypt) and Ahmed D. Metwally.
A modified image theory for vertical magnetic and electric dipoles above a dissipative earth is presented. Namely, the Fresnel reflection coefficient for horizontally polarized wave (H.P.W) is approximated by an exponential term plus a new term which extends the validity of the approximation to high values of the horizontal wave number. While the exponential term represents a single image inside the earth the new added term represent a set of continuous distribution of images. A similar approximation is applied to the Fresnel reflection coefficient of the vertically polarized wave (V.P.W.). These image representation are applied for the determination of input impedances of vertical magnetic and electric dipoles (VMD, VED) and horizontal large loops at very low height above the earth. Excellent agreement with previous exact results is reported in all cases. (Image theory).
Rad. Sci., Paper 1S0660

0780 Scattering
FRESNEL SCATTERING MODEL FOR THE SPECULAR ECHOES OBSERVED BY VHF RADAR
K.S. Gage (Aeronomy Lab, NOAA, 325 Broadway, Boulder, CO 80303) B.B. Balsley and J.L. Green
In recent years several groups using VHF radars have reported highly anisotropic echoes originating from stable regions of the troposphere and stratosphere. The echoes are most intense looking vertically and their occurrence is well correlated with regions of hydrostatic stability. Observations also show that the echoes are usually much stronger when observed with coarse spatial resolution. There is no commonly used scattering or reflection model which can account for these features.
In this paper we present a new model to explain the enhanced vertical echoes. The model pertains to scattering from the half-wavelength Fourier component of horizontally-coherent fine-structure in the radio refractive index within a region of finite vertical extent. We refer to this echoing mechanism as "Fresnel scattering". The new model is applied to simulate the magnitude of VHF radar echoes using radiosonde temperature soundings as input. Good agreement is found between these simulations and observations at the Sunset VHF radar in Colorado.
Rad. Sci., Paper 1S0585

0780 Electromagnetics, Scattering
SCATTERING FROM A PERFECTLY REFLECTING ARBITRARY PERIODIC SURFACE: AN EXACT THEORY
[illegible]
Rad. Sci., Paper 1S0683

Exploration Geophysics

[illegible]

Geochemistry

1410 Chemistry of the Atmosphere
[illegible]

... derived ions (SO_4, NO_3, NH_4, Cl) are the major components deposited in Central Antarctica, the anions forming the more important mass fraction. When considering the ionic composition, the proton is dominant. The antarctic snow melt water can be therefore described as a very diluted mixture of natural acids (most likely H_2SO_4 and HNO_3) containing a small amount of neutral salts (snow, background aerosol).
J. Geophys. Res., Green, Paper 1C0580

Geodesy and Gravity

1910 Crustal movements
STRAIN ACCUMULATION IN SOUTHERN CALIFORNIA 1973-1980
J.C. Savage (U S Geol. Survey, 345 Middlefield Road, Menlo Park, CA 94025), W.H. Prescott, M. Lisowski, and N.E. King.
Frequent surveys of seven trilateration networks in southern California over the interval 1973-1980 suggest that a regional increment in strain may have occurred in 1978-1979. Prior to 1978 and after late 1979 the strain accumulation has been predominantly a uniaxial north-south compression. This secular trend was interrupted sometime in 1978-1979 by an increment in both north-south and east-west extension in five of the seven networks. The onset of this change appears to have occurred first in the networks farthest south. The changes occurred without any unusual seismicity within the networks, but the overall seismicity in southern California was unusually low prior to and has been unusually high since the occurrence. The average principal strain rates for the seven networks in the 1973-1980 interval are 0.17 μstrain/a north-south contraction and 0.08 μstrain/a east-west extension. Although the observed increment in strain could be related to unidentified systematic error in the measuring system, a careful review of the measurements and comparisons with three other measuring systems reveal no appreciable cumulative systematic error. (Strain accumulation, California)
J. Geophys. Res., Red, Paper 1B0620

1930 High order harmonics of the gravity potential field and local gravity anomalies
THE USE OF HEIGHT DATA IN GRAVITY FIELD APPROXIMATION BY COLLOCATION
René Forsberg and C.C. Tscherning (Geodaetisk Institut, Gamlehave Allé 22, DK-2920 Charlottenlund, Denmark)
The accuracy of a gravity field model depends on the amount of available data and on the variation of the gravity field. When topographic height data are available, e.g. in the form of a digital terrain model, it is possible to smooth the gravity field on a local scale by removing the gravitational effects calculated from models of the topographic masses. In this way significant improvements of the prediction results are obtained in mountainous areas.
In the paper we describe methods for the calculation of such gravitational terrain effects, applicable in collocation approximation of the gravity field. The terrain effects on gravity field quantities such as gravity anomalies, deflections of the vertical and geoid undulations are calculated using a system of rectangular prisms, representing either a quasi-traditional model of the topography and isostatic compensation or a residual terrain model (RTM), where only the deviation of the topography from a mean elevation surface is considered.
To test the terrain reduction methods, numerical prediction experiments have been conducted in the mountainous White Sands area, New Mexico. From gravity anomalies spaced appr. 6' apart, other known gravity anomalies and deflections of the vertical were predicted using collocation. When using terrain effects calculated on the basis of [illegible] point heights, the r.m.s. errors decreased by a factor of nearly three to 1" for the deflections and 5-6 mgal for the gravity anomalies, quite insensitive to the actual type of terrain reduction used. The feasibility of using topographic reductions in collocation is thus effectively demonstrated.
J. Geophys. Res., Red, Paper 1B0973

1950 Relations of gravity observations to tectonics and isostasy
ISOSTASY OF THE SOUTHERN MID-ATLANTIC RIDGE: LONG-WAVELENGTH AND SHORT-WAVELENGTH EFFECTS
V. V. Kostoglodov (Institute of Oceanology of U.S.S.R. Academy of Sciences, Krasikova, 23, Moscow B-213, U.S.S.R.) M. G. Kogan and E. I. Miginitskaya
The isostatic transfer function for the southern Mid-Atlantic Ridge was computed from 25 profiles of gravity and topography normal to the ridge trend. As follows from the comparison with previous studies, the transfer function for the Mid-Atlantic Ridge is insensitive to the tectonic setting of profiles used. The experimental transfer function was employed to remove all coherent short-wavelength features in the gravity and topography from 17 long profiles across the southern Mid-Atlantic Ridge. The profiles were then recomputed as a function of t, age of the lithosphere, and averaged over equal ages. The observed regional topography, regional gravity anomaly and altimeter geoid anomaly agree well with conductive cooling models of the spreading lithosphere. [illegible]
J. Geophys. Res., Red, Paper [illegible]

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